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THE DISTRIBUTION OF FUNGI IN PORTO RICO

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What follows is based on a sojourn of two months in Porto Rico, in November and December, 1915, and January, 1916. The fungous flora was examined in several areas, selected to give a good knowledge of the fungi of the island as a whole. The collecting stations were about San Juan, Rio Piedras, Rio Grande, Mameyes, Vega Baja, Manati, Mayagüez, Yauco, Aibonito, and Naranjito. These areas were selected to give a view of the island from end to end and from side to side, and as much variety as possible with respect to elevation and rainfall. All elevations were reached from sea level to the highest on the island, 4,985 feet. All conditions with respect to precipitation of moisture were reached, from the desert conditions on the south side of the island with 15 to 30 inches per annum to 125 to 150 inches about El Yunque.

Each day's collecting occupied long hours and often long tramps, stopping neither for heat nor rain. The hand lens was used freely in the field, and no specimens were taken that did not seem to be in condition for determination. This method gave somewhat more than 2,200 numbers. Had specimens been taken without examination, probably two or three times as many could have been secured. Yet it is doubtful whether the larger amount of work required to study such a collection would add sufficiently to the results to warrant the method.

The prime purpose of the itinerary was to collect the ascomycetes. After these the agarics and the pore fungi received most attention. Among the ascomycetes, the Graphidaceae and the Arthoniaceae received first attention. The rusts and the imperfect fungi which grow on living plants had been collected by F. L. Stevens and others, and these, with the smuts, were passed over. All other fungi were taken as seen; but those outside the groups to which special attention was directed were not, of course, secured in large numbers. The ascomycetes were very abundant, and areas a few rods square, which at first looked most unpromising, often held the collector for hours, taking the fungi from bark, leaves, rocks, pebbles, and soil.

Regarding the fungous flora in general, the rusts, the imperfect fungi, the black Perisporiaceae, the crustose lichens, the pyrenomycetes, and the Hysteriaceae abound. Foliose and fruticose lichens are frequent but scarcely common. Fleshy discomycetes were seen infrequently; but these are difficult to detect, unless one is giving sole attention to them. Agarics are by no means common. Pore fungi were seen more often; but these are scarcely frequent, excepting a few species. Mycelia of the Erysibaceae were seen occasionally, but diligent search failed to reveal any evidence of fruiting. The crustose, often inconspicuous Graphidaceae are the most common fungi; and the even more obscure Arthoniaceae are perhaps next in abundance, though so inconspicuous as to be seen infrequently, except by one well acquainted with the group.

A question about which little seems to be known is whether lichens occur commonly on rocks in the tropics. The rocks were found to bear quite as abundant and perhaps as varied an assemblage of lichens as do similar rocks in temperate regions. At lower elevations the flora of the rocks was peculiar and doubtless tropical, but from 2,000 to 5,000 feet the general appearance of the lichens was about the same as that commonly seen in temperate regions. It is not easy to secure lichens growing on rocks, especially in hot climates; and the failure to get more lichens from tropical rocks evidently does not signify that the plants are absent from such substrata.

Perhaps the thing that would impress the average mycologist most is the absence of the white Ersibaceae in fruit and the great abundance of the black Perisporiaceae in fruited condition. One accustomed to collecting in temperate regions will instinctively examine each white mycelium, expectant of that which seldom if ever results, the finding of perithecia. The white mycelia are rare and are seldom if ever fruited, while the black ones are abundant and are well fruited, except in the desert regions.

To those not acquainted with the tropics, it will probably be a little difficult to realize that the larger basidiomycetes are not abundant or even common. The short-lived agarics are seen but infrequently, and then as isolated specimens, or at best in small numbers. One may see as many in an hour in certain good areas in the mountains of Virginia or Kentucky as he would find in a month in Porto Rico. When seen here, the plants are usually in some well-protected spot, and solitary or so few in number that it is difficult or impossible to get a satisfactory herbarium specimen. Probably great tropical heat is the factor that accounts mainly for the infrequent occurrence of these plants. But the development of the sporophores in many areas of the moist and uniformly heated tropics is probably spread about equally throughout the year, and this would account for the infrequent occurrence of the sporophores at any particular time. Studies of conditions in tropical areas which have wet seasons alternating with dry ones would be interesting in this respect. Such an area was reached about Mayagüez, but the region was, unfortunately, examined during the dry season. The tougher, more durable pore fungi are seen more frequently, but these are by no means common.

The region about Yauco was extremely interesting with respect to the distribution of fungi. In the city and in the flat country to the south, one is in a desert with a rainfall of probably 20 to 30 inches per annum, while in the mountains four or five miles to the north there is abundant rain. In the one area agriculture is possible only through irrigation. In the other, rainfall is abundantly sufficient for agricultural purposes. Day after day rain fell in the mountains a few miles north of Yauco, while in Yauco and to the south the weather was dry. The mycologist is of course interested to know how the fungous flora is affected. Agarics and pore fungi were almost entirely absent south of Yauco, but were seen as often five miles to the north as in other parts of the island. The black Perisporiaceae were entirely absent from the desert, while they were abundant on leaves north of Yauco. To the uninitiated, the lichen flora of this desert would appear most uninviting, for scarcely a foliose or a fruticose specimen was seen. However, rocks, bark, and wood were plastered over with crustose, usually inconspicuous forms. Indeed, the largest collection of fungi secured in a single day was 105 specimens obtained the first day in the desert south of Yauco. This collection will prove of special value for the large number of Graphidaceae and Arthoniaceae taken. No fleshy discomycetes were seen in the desert. No fungi were seen on the leaves, except possibly an occasional rust or an imperfect fungus, though fungi of various kinds abound on leaves in other parts of the island. No myxomycetes were seen south of Yauco, while these plants are common north of the city. The change in fungous flora in passing one mile or at most two miles northward from Yauco is most astonishing. The remarkable accompanying change in seed-plant flora is quite as interesting, but this lies outside the limits of this paper.

The collection has not been studied sufficiently to permit a more detailed statement regarding distribution; but the general account given above will, it is hoped, prove interesting and valuable. The great interest and value that would result from floristic and ecologic studies of the fungous flora of the island as a whole, and extending over many years, were distinctly realized during my short sojourn there. Much of great interest and value to the botanist and to the agriculturist and the horticulturist as well would result from such a detailed study of the fungous flora of Porto Rico.

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